What is claimed is:

1. A technique for measuring intersubband electroluminescence spontaneous emission from a unipolar quantum cascade laser device, the technique comprising the steps of:

a) forming a unipolar quantum cascade laser device, comprising a ridge waveguide structure including a longitudinally disposed active region and a pair of laser facets at the entrance and exit of said ridge waveguide;

b) longitudinally cleaving said laser device along the ridge waveguide structure;

c) forming highly reflective coatings on said pair of laser facets;

d) energizing said QC laser device with an input current to initiate lasing emission along or in the direction of the ridge; and

e) measuring the intersubband electroluminescence spontaneous emission from the longitudinal portion of the active region exposed by the cleaving process of step b).

2. The technique of claim 1 wherein in performing step e), the measuring step includes spatial filtering the emission to separate scattered laser emission from ISB-EL spontaneous emission.

3. The technique of claim 1 wherein in performing step e), the measuring step includes performing a polarization analysis of the measured emission to distinguish laser emission along the cavity from TM polarized ISB-EL spontaneaous emission through the long-side cleave.

4. The technique of claim 1 wherein in performing step b), the longitudinal cleaving is performed through the approximate center of the ridge waveguide structure.

5. The technique of claim 1 wherein in performing step c) the laser facets are coated with a layer of SiO_2, covered by a layer of Ti/Au.

6. The technique of claim 1 wherein in performing step d), the QC laser is biased below threshold and the spontaneous emission is measured.

7. The technique of claim 1 wherein in performing step d), the QC laser is biased above threshold and the spontaneous emission is measured.

8. A unipolar quantum cascade laser device comprising

an active region formed as a ridge waveguide structure on a top major surface of a semiconductor substrate;

an insulating layer disposed to cover the extent of said active region;

a bottom metal contact layer disposed to overlay a bottom major surface of said semiconductor substrate; and

a pair of laser facets formed as the terminations of said ridge waveguide structure, said facets formed to be orthogonal to the extent of said ridge waveguide structure such that upon the application of a bias current between said top and bottom metal contact layers, laser emission will be created in a longitudinal direction along said ridge waveguide structure and exit at said pair of laser facets (only if not coated)

CHARACTERIZED IN THAT

the unipolar quantum cascade laser structure is formed to include a longitudinal cleave through the ridge waveguide structure so as to expose the active region and a longitudinal face of said semiconductor substrate and waveguide, and the laser facets include a highly reflective surface coating, such that intersubband electroluminescence (ISB-EL) will exit from the exposed active and region.

9. The device of claim 8 wherein the insulator layer comprises a layer of SiN.

10. The device of claim 8 wherein the top and bottom metal contact layers comprise Ti/Pt/Au.

11. The device of claim 8 wherein the laser facet coatings include an inner layer of SiO_2 and an outer layer of Ti/Au and Ge/Au/Ag/Au respectively.